

2. INITIAL CONCEPTUAL SITE MODEL

An initial conceptual site model for the City Parcel Site is presented in Figure 4. The conceptual site model describes the potential migration and exposure pathways for contaminants that have been documented at the site. The site model also presents a preliminary summary of human health and environmental impacts that are potentially associated with the documented contamination at the site.

The highest potential exposure risks due to contamination at the City Parcel Site are associated with residents and workers that are located near the site. Possible exposure scenarios may include dermal contact with contaminants, ingestion of contaminated soil or vegetables, dust inhalation, and drinking water consumption from nearby groundwater wells. The following sections describe the relative contamination in various media and the likelihood of transport of contaminants in each media. The descriptions below are based on historic sampling information previously collected at the site.

2.1 Soil

The contamination of soil with hazardous chemicals has been documented in several limited site investigations at the City Parcel Site. See the discussion of environmental conditions above for more information. The constituents of concern in soil are PCBs, volatile organic compounds, and petroleum hydrocarbons.

2.2 Groundwater

The presence of soil contamination at the City Parcel Site indicates the possibility that groundwater contamination may have occurred as a result of PCB, volatile organic compound, and/or petroleum hydrocarbon releases. One of the goals of this RI will be to confirm or refute the suspected presence of contaminants in groundwater. The justification for completing a groundwater investigation, and for inclusion of groundwater contamination as a possible contaminated media is presented below.

Following a limited site investigation in 1997, George Maddox and Associates presented an interpretation of soil testing results in a report (GMA 1997) to Mr. Paul Gisselburg, the owner of the City Parcel property. The following statements were included in the report.

"...erratic values of PCB [concentrations] indicate several spills of fluid containing PCB in the area of the City Parcel Building. PCB content of soil in the alley to the east of the City Parcel building appears to be the result of past policies of discarding PCB contaminated fluid into the alley prior to construction of the building extension."

"The high concentration of PCB in soil at the inside dry well may reflect the transmission of PCB through the entire 50-foot thickness of glacial flood gravel to the underlying groundwater. This groundwater is part of the Spokane-Rathdrum aquifer that has been designated by the U.S. Environmental Protection Agency as the sole source of drinking water for the area."

Due to the gravelly nature of the soils at the City Parcel Site, there is an increased risk of contaminant transport from soil to groundwater. The contaminant transport risk, coupled with the suspected use of dry wells for disposal of PCB oils and other hazardous substances, provides the basis for including a groundwater investigation in this RI.

2.3 Surface Water

Storm water drainage from the City Parcel Site is a potential pathway for the migration of contamination offsite. The migration of contaminants could lead to contamination spreading to surface water bodies and/or the spread of soil contamination over a larger area.

The nearest surface water body is the Spokane River – located approximately 0.75 miles northwest of the site. It is unlikely that storm water from the City Parcel site is being directly discharged to surface water – assuming storm drains in the area do not discharge directly to the river.

The storm water runoff from the City Parcel Site is believed to be primarily conveyed offsite through a storm drain located at the NE corner of Cook Street and Springfield Avenue, and a storm drain located near the corner of the alley (on the east property line) and Springfield Avenue. The presence of PCBs in storm drain sediments has been confirmed by previous investigations at the site. The RI physical site study will include an investigation of drainage features at the site to determine the discharge point for the storm drains in the area, and make recommendations for further study of drainage systems to be completed during the soil investigation.

2.4 Air Emissions

The conceptual site model does not address air emissions as a contaminated media or exposure pathway for the City Parcel Site. Air emissions associated with the contamination at the site are believed to be negligible for the following reasons:

- The PCB contamination present at the site is believed to be associated with transformer fluid releases. PCBs and the fluids typically containing PCBs have low volatility.
- Organic contamination in the soil (associated with hydrocarbons and other organic compounds) is weathered and not likely to lead to air emissions that cause acute impacts on human health and the environment in the area in and around the site. As a precaution, organic screening will be employed during the RI field investigations to assure organic air emissions from the site are within acceptable health and safety limits during sampling activities.
- The generation of dust from the site is minimal. The main exposed surfaces on the property (alley and gravel parking lot) are compacted and/or covered with gravel. This reduces the generation of dust from the site. As a precaution during the RI, dust suppression techniques will be employed, as needed, to minimize or eliminate airborne contamination resulting from disturbance of soil in and around the City Parcel Site.

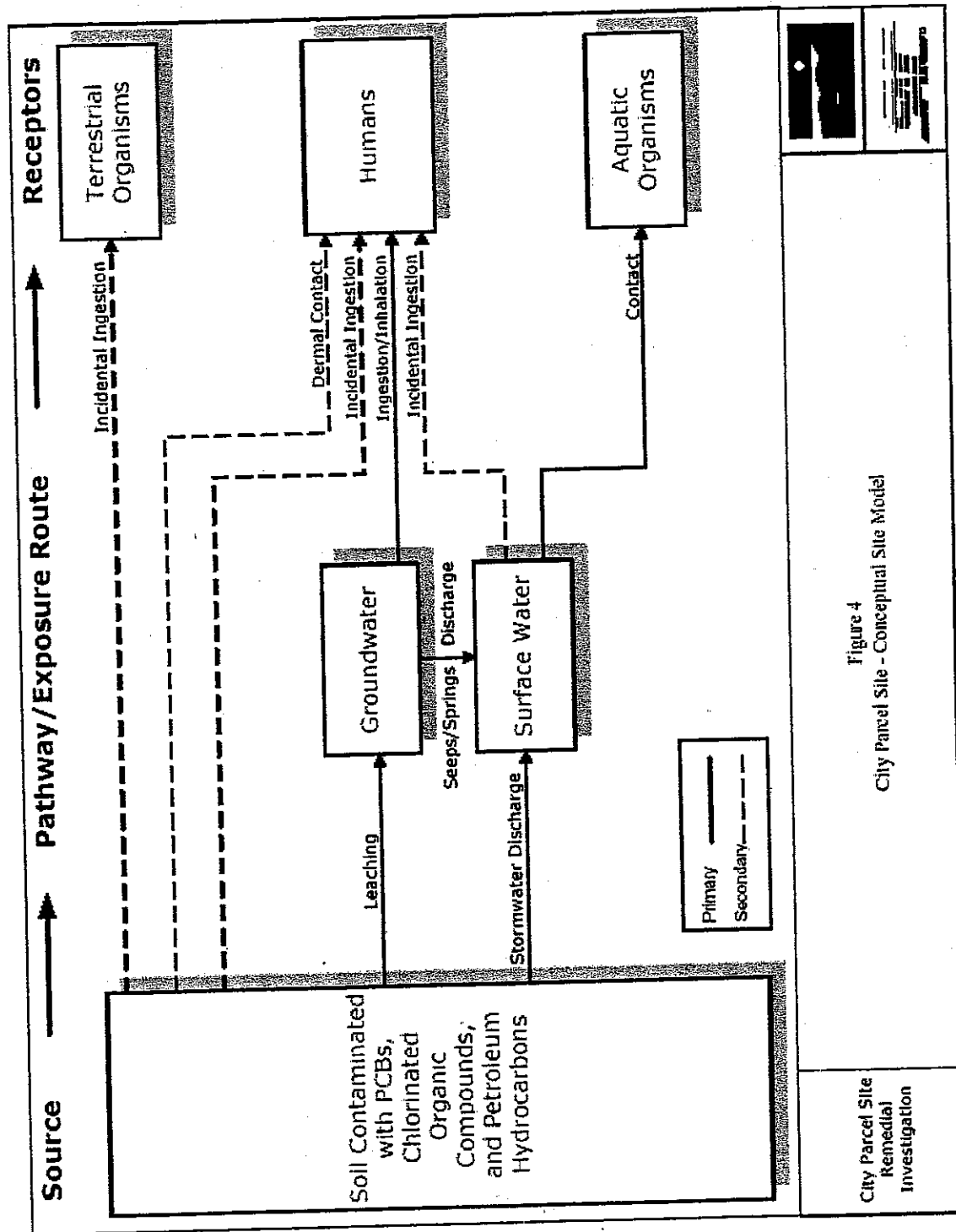


Figure 4: Preliminary Conceptual Site Model

3. RI DATA REQUIREMENTS

The objective of this project is to complete a Remedial Investigation (RI) for the City Parcel Site per requirements in WAC 173-340-350. The purpose of the Remedial Investigation (RI) is to determine the nature and extent of releases of hazardous substances (as defined by RCW 70.105D.020(7)) from the Facility (as defined in RCW 70.105D.020(4)), and to gather necessary data to support a Feasibility Study.

Based upon the previous investigations at the site, the primary focus of this RI will be on determining PCB contamination levels in soil and groundwater (if present). Additional sampling and analysis for TPH-Diesel and VOCs will also be performed. Ecology may use the completed RI to prepare a Feasibility Study and, in turn, develop a Cleanup Action Plan for the site.

The RI field studies planned for the City Parcel Site will allow Ecology to answer a number of questions that are specific to contamination at the site. The site-specific data needs are listed as questions below.

- What is the concentration of PCBs in the exposed surface and near-surface soils around the property?
- What TPH fractions and VOC constituents exist in the exposed surface and near-surface soils around the City Parcel property?
- What is the background concentration of PCBs and TPH in soil?
- What potential sources of contamination and contaminant transport exist in and around the City Parcel building, and where are underground utilities located?
- What is the concentration of PCBs and organics in soils under the City Parcel building?
- What is the concentration of PCBs and organics in the deeper soils around the property?
- What are the geotechnical properties of the soils around the City Parcel property? (This information may be used for designing/evaluating cleanup alternatives)
- What contaminants exist in groundwater (if any) due to PCBs and hydrocarbons in the soil at the site?
- What is the general quality of groundwater at the site? (This information may be needed for designing/evaluating cleanup alternatives)
- What fluctuations in groundwater level occur at the site?

The associated data requirements for each of the data needs are listed in Table 3-1. The Data Quality Objectives listed in Table 3-2 will be applied to the laboratory analytical processes to assure data requirements are met and valid analysis results are obtained.

Table 3-1: Data Requirements

Data Need	Field Tasks	Sampling Method	Location/Depth	Analyses	Comments
What is the concentration of PCBs in the exposed surface and near-surface soils around the property?	Collect soil samples around the outside of the building.	Direct-push rig (Geoprobe)	Collect discrete samples from 0-6" bgs and 6-12" bgs at 49 grid stations along eastern extent of building and in the parking lot area.	Total PCBs* PCBs as Aroclors and congeners**	* Discrete samples collected from 6-12" submitted for 48-hour expedited turn-a-round. ** 15 samples selected for Aroclors and congeners analysis based on Total PCBs results.
What TPH fractions and VOC constituents exist in the exposed surface and near-surface soils around the City Parcel property?	Collect soil samples around the outside of the building.	Direct-push rig (Geoprobe)	Collect discrete samples from 0-6" bgs and 6-12" bgs at 49 grid stations along eastern extent of building and in the parking lot area.	NWTPH-Dx** VPH, EPH, and VOCs***	** Select sample using PID screening of 6-12" bgs PCB samples. *** Select sample using highest PID screening results for 6-12" bgs PCB samples.
What is the background concentration of PCBs and TPH?	Collect Background Soil Samples	Direct-push rig (Geoprobe)	2 offsite stations, Collect discrete samples at 0-6" bgs and 6-12" bgs	PCBs and NWTPH-Dx	Appropriate locations for obtaining background samples to be recommended by Ecology
What sources of contamination & contaminant transport exist in and around the City Parcel building, and where are underground utilities located?	Survey of floor drains, dry wells, sumps, stormwater drains, and underground utilities.	NA	Throughout site	NA	Conduct drain tracing video survey of all floor drains sumps and associated piping to point of discharge. Complete utility locate services
What is the concentration of PCBs and organics under the City Parcel building?	Exploratory Drilling and Sampling underneath the Building	Geoprobe or Air-rotary drilling (ODEX) and split-spoon samples	Sample at 5 stations in and near potential source areas (floor drains and associated piping, sumps, dry well and former underground tank locations).	Total PCBs and PCBs as Aroclors and congeners* NWTPH-Dx** VPH, EPH, and VOCs***	* Analyze all samples for Total PCBs and 1 sample per boring for Aroclors and congeners. ** Analyze 4 samples from selected intervals *** Analyze 1 sample from each boring

Remedial Investigation at City Parcel Site

R1 Work Plan

Data Need	Field Tasks	Sampling Method	Location/Depth	Analyses	Comments
What is the concentration of PCBs and organics in the deeper soils around the property?	Drill and collect soil samples at proposed monitoring well locations	Air-rotary drilling (ODEX) with split-spoon samples collected on 5-ft intervals	See SAP	Total PCBs and PCBs as Aroclors and congeners NWTPH-Dx** VPH, EPH, and VOCs*** Grain Size, CEC, Moisture, Atterburg limits, TOC, Modified Proctor, Permeability	* Analyze all samples for Total PCBs and 1 sample per boring for Aroclors and congeners. ** 4 discrete samples per boring, selection of samples submitted for analysis based on highest headspace *** 1 discrete sample per boring, selected based on PID screen * 1 sample collected near surface, 1 sample collected between 25-60 feet bgs at each well location
What are the geotechnical properties of the soil around the City Parcel property? (for evaluating cleanup alternatives)	Drill and sample at proposed monitoring well locations	Air-rotary drilling (ODEX) with split-spoon samples collected on 5-ft intervals	See SAP	Total PCBs and PCBs as Aroclors and congeners VPH, and EPH** Calcium, iron, magnesium, manganese, potassium, sodium, chloride, nitrate/nitrite, sulfate, alkalinity (total and bicarbonate), TOC, TDS, COD, ammonia, turbidity Field Measurements of pH, temp, DO, conductivity, and turbidity	* Quarterly samples from 5 wells. ** Quarterly samples from 3 wells. *** Quarterly samples collected from 5 wells.
What contaminants exist in groundwater (if any) due to PCB and TPH soil contamination at the site?	Install and sample 4 monitoring wells and sample 1 existing site monitoring well	QED Mircopurge® system	See SAP 1 existing well (MW-1) 1 upgradient well (MW-2) 3 downgradient wells (MW-3, 4, 5)	See SAP 1 existing well (MW-1) 1 upgradient well (MW-2) 3 downgradient wells (MW-3, MW-4, MW-5)	
What is the general quality of groundwater at the site? (This information may be needed for evaluating cleanup alternatives)	Install and sample 4 monitoring wells and sample 1 existing site monitoring well	QED Mircopurge® system	See SAP 1 existing well (MW-1) 1 upgradient well (MW-2) 3 downgradient wells (MW-3, MW-4, MW-5)	See SAP 1 existing well (MW-1) 1 upgradient well (MW-2) 3 downgradient wells (MW-3, MW-4, MW-5)	
What is the fluctuation in groundwater level at the site?	Install pressure transducer and data logger	NA	1 well (to be determined in the field)	NA	Water level measured every 4 hours for 2 quarters. Data retrieval to occur during quarterly sampling activities

Table 3-2: Data Quality Objectives

ANALYTE	Soil Precision (RPD)	Soil Accuracy (%R) LCS	Soil Accuracy (%R) MS/MSD	Water Precision (RPD)	Water Accuracy (%R) LCS	Water Accuracy (%R) MS/MSD	Surrogate %R
PCBs							
Aroclor-1016	± 35%	50-150	50-150	± 20 %	50-150	50-150	50-150
Aroclor-1260	± 35%	50-150	50-150	+ 20 %	50-150	50-150	50-150
TCMX							30-150
Decachlorobiphenyl							
Volatiles							
Benzene	± 35%	85-114	85-114	± 20 %	81-141	81-141	81-141
Chlorobenzene	± 35%	89-109	89-109	± 20 %	75-130	75-130	75-130
1,1-Dichloroethene	± 35%	52-145	52-145	± 20 %	71-136	71-136	71-136
Toluene	± 35%	87-112	87-112	± 20 %	62-155	62-155	62-155
Trichloroethene	± 35%	87-113	87-113	± 20 %	75-138	75-138	75-138
1,2-Dichloroethane-d4							76-114
Tluene-d8							88-110
4-bromofluorobenzene							86-115
NWTPH-Dx							
Diesel Range	± 35%	50-150	50-150	± 20 %	50-150	50-150	
Heavy Oil Range	± 35%	50-150	50-150	± 20 %	50-150	50-150	
2-FBP							50-150
p-terphenyl-d14							50-150
VPH	± 35%	50-150	50-150	± 20 %	50-150	50-150	
surrogate							50-150
EPH	± 35%	50-150	50-150	± 20 %	50-150	50-150	
surrogate							50-150
Metals							
Calcium	± 35%	80-120	75-125	± 20 %	80-120	75-125	NA
Iron	± 35%	80-120	75-125	± 20 %	80-120	75-125	NA
Magnesium	± 35%	80-120	75-125	± 20 %	80-120	75-125	NA
Manganese	± 35%	80-120	75-125	± 20 %	80-120	75-125	NA
Potassium	± 35%	80-120	75-125	± 20 %	80-120	75-125	NA
Sodium	± 35%	80-120	75-125	± 20 %	80-120	75-125	NA
Conventionals							
Chemical Oxygen Demand				± 20 %	80-120	75-125	NA
Total Organic Carbon				± 20 %	80-120	75-125	NA
Solids, Total				± 20 %	80-120	75-125	NA
Solids, Total Dissolved				± 20 %	80-120	75-125	NA
Ammonia				± 20 %	80-120	75-125	NA
Nitrogen, NO ₃ & NO ₂				± 20 %	80-120	75-125	NA
Alkalinity, total				± 20 %	80-120	75-125	NA
Alkalinity, as bicarbonate				± 20 %	80-120	75-125	NA
Chloride				± 20 %	80-120	75-125	NA
Sulfate				± 20 %	80-120	75-125	NA
Turbidity				± 20 %	80-120	75-125	NA
Geotechnical Parameters							
Grain Size Analysis	± 35%	NA	NA				NA
Atterberg Limits	± 35%	NA	NA				NA
Percent Moisture	± 35%	NA	NA				NA
Permeability	± 35%	NA	NA				NA
Modified Proctor Density	± 35%	NA	NA				NA

RPD - Relative percent difference based on sample/duplicate or matrix spike/matrix spike duplicate results

%R - Percent recovery

VOC target recoveries are based on supplied laboratory limits

NA - Not Applicable

If columns are left blank for a particular matrix, then those tests are not being analyzed for that matrix

4. REMEDIAL INVESTIGATION TASKS

SAIC will conduct three related investigations at the City Parcel Site – a site physical study, a soil investigation, and a groundwater investigation. The primary focus of the effort will be on determining PCB contamination levels in soil and groundwater. Additional sampling and analysis (for TPH and VOCs) is planned – but for fewer samples.

Data from the field investigations will be developed in a manner consistent with the Quality Assurance Project Plan (QAPP) section in the final Sampling and Analysis Plan (SAP). All sampling and analysis activities shall be conducted in accordance with the final SAP. All sampling locations and procedures will be documented in a log and identified on a site map. Note: The SAP (containing Field Sampling Plan and QAPP sections) will be submitted to Ecology as a stand-alone document.

To complete the field investigation and reporting task, SAIC will subcontract portions of this task to a qualified drilling company, an analytical laboratory, a geotechnical (soil testing) laboratory, and a data validation subcontractor. SAIC will perform project oversight for all subcontracted services.

The drilling subcontractor will install and develop the groundwater monitoring wells and will provide geoprobe and drilling services for obtaining soil samples. The data validation subcontractor will provide independent data quality validation services in a manner consistent with the SAP.

The following activities will be performed as part of the RI:

- Evaluate all drainage features present at the property, including sumps, dry wells, subsurface drains and associated piping to their discharge points off site using drain tracing video technology and other techniques.
- Locate all utilities, stormwater management, electrical, water, and wastewater features, and document them on a site map prior to the start of drilling activities.
- Sample shallow soils from 0 to 12 inches below ground surface (bgs) on a grid system outside of the building.
- Sampling shallow and deep subsurface soils inside the building near suspected contamination sources including, sumps, dry wells, former underground storage tank locations, and potentially broken or leaking drainage lines.
- Collect subsurface soil samples at 5-foot intervals to groundwater outside the building
- Install four ground water monitoring wells.
- Collect ground water samples from four new monitoring wells, and attempt to collect samples from one existing site well, during two quarterly sampling events.
- Collect background soil samples to compare PCB and TPH levels with site soils data.

The following subsections provide a more detailed description of the RI tasks listed above.

4.1 Site Physical Study

The first phase of the RI fieldwork will include a site physical study to determine and document all drainage features and utility locations. The following sections describe the activities in more detail.

4.1.1 Drainage Features

All drainage features present on the property, including sumps, dry wells, subsurface drains, and associated piping, shall be investigated to establish discharge points. The investigation will also seek to identify potential damage to drain lines that may have served as contamination sources to soil and groundwater. SAIC will document drainage features through the use of drain tracing video inspection. The location of drains, possible breaches in drains, and discharge points will be documented on a site map and included in the RI Report.

The site physical study will include a review of stormwater management features in and around the City Parcel property. SAIC will record observations about the most probable drainage patterns for runoff from the site based on terrain, storm drain locations, and other pertinent factors. The point of discharge for storm drains located near the City Parcel facility will also be determined. The stormwater runoff and management features will be documented on a site map and included in the RI Report.

4.1.2 Utilities

All utilities, including electrical, water, fire water, sanitary sewer, and stormwater shall be located, and those locations documented on a site map. Geophysical location services or other methods shall be employed as necessary at proposed well and exploratory boring locations to ensure subsurface investigations avoid penetration of buried metallic objects.

4.2 Soil Investigation

A detailed description of soil sampling procedures is provided in the SAP. Detailed quality assurance procedures for field sampling and laboratory analysis activities are also included in the SAP. The descriptions provided below and in the subsequent sections provide an overview of the tasks and analyses to be completed during the soil investigation.

The soil investigation to be completed by SAIC will include the collection of surface, near surface, and subsurface soil samples for analysis of PCB, VOC, and TPH contaminants. Shallow outdoor soil samples (0" – 12" bgs) will be collected using a geoprobe rig. Two discrete soil samples will be acquired at each geoprobe location (0-6" & 6-12"). The proposed sample locations are described in the SAP, but may be modified as information is gathered in the field.

Deeper subsurface soil samples will be obtained using a split spoon sampler during the installation of four ground water wells, and during the completion of five exploratory borings under the City Parcel building. The sampling team will evaluate the possible use of geoprobe sampling for obtaining soil samples from exploratory borings under the building – based on soil conditions and achievable penetration depths. The frequency of samples and the proposed locations for the wells and exploratory borings are described in the SAP.

All soil samples will be screened using a photo-ionization detector (PID). The PID will be used to determine samples exhibiting the highest levels of organic compound contamination. At the completion of each day's sampling activities, the samples with the highest PID readings will be identified and submitted for analysis of organic contamination – in addition to PCB analysis. The analysis methods to be used for determining organic contamination will be Diesel range total petroleum hydrocarbons using Ecology's NWTPH-Dx method. A limited number of samples exhibiting the highest PID readings will be further analyzed using Volatile and Extractable Petroleum Hydrocarbons methods (per Ecology publication 97-602) and volatile organic compounds (per EPA Method 8260).

Using the PID readings as a screen will reduce analysis requirements and help contain analytical costs, while assuring that appropriate data are gathered for targeted samples. A total of 52 NWTPH-Dx samples will be identified during the soil investigation. A total of 12 volatile and extractable hydrocarbon soil samples and 12 VOC soil samples will also be identified.

The soil investigation will include a determination of area background concentrations for PCBs and NWTPH-Dx in soil using two offsite sample locations. Discrete background concentration samples will be collected at 0-6" and 6-12" bgs at each location. Ecology will provide the appropriate locations for obtaining background samples.

This RI will include the installation of four new monitoring wells in and around the site. The soil investigation will use samples collected during the well installation process to determine subsurface contamination levels. Monitoring well installation will be performed with an ODEX drill. This method will allow a casing to be driven as the cutting head is advanced into the subsurface materials. The cutting head will be retracted allowing the split-spoon or Dames and Moore sampler to be driven beyond the casing and cutting head. Soil samples will be driven at 5-foot intervals from ground surface to anticipated total depth of the borehole. A total of 52 samples (13 samples per well boring) are expected to be collected for PCB analysis.

The samplers will be opened and immediately screened with a photo-ionization detector (PID) to detect the presence of organic compounds. Organic compound screening will be performed to direct the selection of samples for further analysis. In the absence of detectable organic compounds, samples for TPH-Dx analysis will be collected at equally spaced intervals through the entire depth of the borehole. Volatile and extractable hydrocarbons and VOC samples will be collected from the soil sample immediately above the water table.

Two samples for physical (geotechnical) testing will be collected at each well boring using a split-spoon or Dames and Moore sampler with stainless-steel sleeves. Based upon existing geologic data at the site, sample intervals are anticipated near the ground surface and between 25 to 60 feet bgs. Final determination of the interval for geotechnical samples will be based upon the variability of geologic material observed in the field.

Soil sampling activities under the City Parcel building will require concrete coring services to be completed by the drilling subcontractor. A confined access drill rig may be necessary if ceiling clearance is limited inside the City Parcel building. For the exploratory borings under the building, the soil sampling procedures will be similar to the monitoring well borings, with the exception that geotechnical soil samples will not be collected from the exploratory borings. The

sampling team will evaluate the possible use of geoprobe sampling for obtaining soil samples from exploratory borings under the building – based on soil conditions and achievable penetration depths.

Preliminary sample results for total PCB concentrations will be provided within a 48-hour turnaround for the soil samples listed below. The expedited turn-around will facilitate focused subsequent sampling activities (if directed by Ecology) in a timely fashion. All other analytical results will be reported in a non-expedited fashion.

- Discrete samples at 6-12" depths
- Exploratory boring samples
- Monitoring well boring samples

4.2.1 Soil Sample Stations

Outdoor soil samples will be obtained in the exposed soil areas north of the building, in the alleyway to the east of the building, and in the western edge of the adjoining John Barrier Trust Property – located to the east of the City Parcel building. Sample stations in the parking area along the north side of the building will be established on approximately 18-foot centers and will extend from the building north to the southern edge of the adjoining property. Sample stations in the alley to the east of the building will be established on 6-foot centers and extend east to the western edge of the adjacent property and north to the parking area. The grid sampling approach, coupled with expedited Total PCB results, will assist Ecology and SAIC to identify areas of high PCB concentrations, and modify subsequent sampling locations in the field if necessary. Modified sampling locations will be used to complete higher density sampling in areas of concern (if needed).

Geoprobe samples will be obtained for 49 soil probes to 1 ft depth. Two soil samples will be acquired at each geoprobe location (0-6" and 6-12"). Soil samples from greater depths will be obtained from the groundwater monitoring well installations and the exploratory borings.

A total of five exploratory soil borings will be completed inside the City Parcel building, and located as described in the SAP. The proposed exploratory boring locations are focused around floor drain features, dry well locations, underground tank locations, and associated piping as defined in the site physical study. The proposed sample locations in the SAP are subject to revision based on the findings of the site physical study and 48-hour turnaround results for Total PCBs.

Additional soil samples will be obtained during the installation of four ground water monitoring wells to be installed as part of the groundwater investigation. The number of samples to be collected, and the proposed well locations are described in the SAP.

4.2.2 Soil Chemical Analyses

Soil samples will be collected and analyzed for the contaminants listed below. Not all samples will be analyzed for all contaminants. See the discussion in Section 4.2 above for information on targeting soil samples for organic analysis. Additional geotechnical soil tests will be run on soil samples obtained from monitoring well borings. The geotechnical tests are described later.

- Total PCBs and PCBs as Aroclors and congeners per EPA SW-846 Method 8082
- Volatile Organic Compounds per EPA SW-846 Method 8260
- Diesel Range TPH (NWTPH-Dx) per Ecology publication 97-602
- Volatile and Extractable Petroleum Hydrocarbons per Ecology publication 97-602

Table 4-1 presents a listing of the soil analyses to be completed for the City Parcel Site RI. The table cross-references the analytical test description with a list of analytes for each test, the laboratory method to be used, and the estimated number of soil samples to be submitted for each test.